

22763 U.S. PTO  
021104

SEQUENCE LISTING

<110> Cole, David  
Cummins, Ian  
Edwards, Robert

<120> METHODS OF IDENTIFYING COMPOUNDS THAT INDUCE EXPRESSION OF  
GLUTATHIONE S-TRANSFERASE

<130> A33083-PCT-USA-I (072667.0195)

<140> To Be Assigned  
<141> 2004-02-11

<150> 09/508,710  
<151> 2000-07-10

<150> PCT/GB98/02802  
<151> 1998-09-16

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<170> FastSEQ for Windows Version 3.0

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<213> Triticum aestivum L.

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<223> Glutathione S transferase

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Lys Gly Leu Val Leu Leu Asp Phe Trp Val Ser Pro Phe Gly Gln Arg	
5 10 15 20	
gtg cgc atc gcg ctg gcc gag aag ggc ctg ccc tac gag tac gcg gag	153
Val Arg Ile Ala Leu Ala Glu Lys Gly Leu Pro Tyr Glu Tyr Ala Glu	
25 30 35	
gag gac ctg atg gcc ggc aag agc gac cgc ctc ctc cgc gcc aac ccg	201
Glu Asp Leu Met Ala Gly Lys Ser Asp Arg Leu Leu Arg Ala Asn Pro	
40 45 50	
gtg cat aag aag atc ccg gtg ctc ctc cac gac ggc cgt gcc gtc aac	249
Val His Lys Lys Ile Pro Val Leu Leu His Asp Gly Arg Ala Val Asn	

55	60	65	
gag tcc ctc atc atc ctc cag tac ctg gag gag gcc ttc ccg gac gcg			297
Glu Ser Leu Ile Ile Leu Gln Tyr Leu Glu Glu Ala Phe Pro Asp Ala			
70	75	80	
ccc gct ctg ctc ccc tcc gac ccc tac gcg cgc gcg cag gcc cgc ttc			345
Pro Ala Leu Leu Pro Ser Asp Pro Tyr Ala Arg Ala Gln Ala Arg Phe			
85	90	95	100
tgg gcc gac tac gtc gac aag aag gtc tac gac tgc ggc tcc cgc ctc			393
Trp Ala Asp Tyr Val Asp Lys Lys Val Tyr Asp Cys Gly Ser Arg Leu			
	105	110	115
tgg aag ctc aag ggc gag ccg cag gcg cag gcg cgc gcc gag atg ctg			441
Trp Lys Leu Lys Gly Glu Pro Gln Ala Gln Ala Arg Ala Glu Met Leu			
	120	125	130
gac atc ctc aag acc ctc gac ggc gcg ctc ggg gac aag ccc ttc ttc			489
Asp Ile Leu Lys Thr Leu Asp Gly Ala Leu Gly Asp Lys Pro Phe Phe			
	135	140	145
ggc ggc gac aag ttc ggg ttc gtc gac gcc gcc ttc gcg ccc ttc acc			537
Gly Gly Asp Lys Phe Gly Phe Val Asp Ala Ala Phe Ala Pro Phe Thr			
	150	155	160
gcg tgg ttc cac agc tac gag agg tac ggc gag ttc agc ctg ccg gag			585
Ala Trp Phe His Ser Tyr Glu Arg Tyr Gly Glu Phe Ser Leu Pro Glu			
	165	170	175
gtg gcg ccc aag atc gcc gcg tgg gcc aag cgc tgc ggc gag cgg gag			633
Val Ala Pro Lys Ile Ala Ala Trp Ala Lys Arg Cys Gly Glu Arg Glu			
	185	190	195
agc gtc gcc aag agc ctc tac tcg ccg gac aag gtg tac gac ttc atc			681
Ser Val Ala Lys Ser Leu Tyr Ser Pro Asp Lys Val Tyr Asp Phe Ile			
	200	205	210
ggc ctg ctc aag aag aag tac ggc atc gag taggcgcgcc gacggacgga			731
Gly Leu Leu Lys Lys Lys Tyr Gly Ile Glu			
	215	220	
cggaacggggcc atgcaggcga cagccggccc gccgtccgga gggaagcaac aaataaatca			791
gggagcgatt tgggtggcct acaatgcgta cgtctggata gagtatttct ttctttcttt			851
cttcgtggaa taaagtgtc cgtgtgtgtg tggttggttg ttgttggttg gatcagtcag			911
tgtgtgtggg tgcgtgttgt gtactcagta ctcgtgatgt gtgtgtgtgt caatgtgtca			971
accctggtct tcggtggggg cagcaccgag ttgccacctg ccattccatt tccattccgg			1031
gcgatgaata aattaaaaaa gagtctcatt tgtttaaaaa aaaaaaaaaa aaaa			1085

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<212> PRT

<213> Triticum aestivum L.

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Phe	Gly	Gln	Arg	Val	Arg	Ile	Ala	Leu	Ala	Glu	Lys	Gly	Leu	Pro	Tyr
		20					25					30			
Glu	Tyr	Ala	Glu	Glu	Asp	Leu	Met	Ala	Gly	Lys	Ser	Asp	Arg	Leu	Leu
	35					40					45				
Arg	Ala	Asn	Pro	Val	His	Lys	Lys	Ile	Pro	Val	Leu	Leu	His	Asp	Gly
	50					55					60				
Arg	Ala	Val	Asn	Glu	Ser	Leu	Ile	Ile	Leu	Gln	Tyr	Leu	Glu	Glu	Ala
65				70					75					80	
Phe	Pro	Asp	Ala	Pro	Ala	Leu	Leu	Pro	Ser	Asp	Pro	Tyr	Ala	Arg	Ala
			85					90						95	
Gln	Ala	Arg	Phe	Trp	Ala	Asp	Tyr	Val	Asp	Lys	Lys	Val	Tyr	Asp	Cys
		100					105						110		
Gly	Ser	Arg	Leu	Trp	Lys	Leu	Lys	Gly	Glu	Pro	Gln	Ala	Gln	Ala	Arg
	115					120					125				
Ala	Glu	Met	Leu	Asp	Ile	Leu	Lys	Thr	Leu	Asp	Gly	Ala	Leu	Gly	Asp
	130					135					140				
Lys	Pro	Phe	Phe	Gly	Gly	Asp	Lys	Phe	Gly	Phe	Val	Asp	Ala	Ala	Phe
145				150					155					160	
Ala	Pro	Phe	Thr	Ala	Trp	Phe	His	Ser	Tyr	Glu	Arg	Tyr	Gly	Glu	Phe
			165					170						175	
Ser	Leu	Pro	Glu	Val	Ala	Pro	Lys	Ile	Ala	Ala	Trp	Ala	Lys	Arg	Cys
		180					185					190			
Gly	Glu	Arg	Glu	Ser	Val	Ala	Lys	Ser	Leu	Tyr	Ser	Pro	Asp	Lys	Val
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Tyr	Asp	Phe	Ile	Gly	Leu	Leu	Lys	Lys	Lys	Tyr	Gly	Ile	Glu		
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 <213> Triticum aestivum L.

<220>  
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 <222> (54)...(725)  
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															Met
															1
gcg gcg ccg gcg gtg aag gtg tac ggg tgg gcg atg tcg ccg ttc gtg															104
Ala Ala Pro Ala Val Lys Val Tyr Gly Trp Ala Met Ser Pro Phe Val															
															5 10 15
gcg cgc gcg ctg ctg tgc ctg gag gag gcc ggc gtg gag tac gag ctc															152
Ala Arg Ala Leu Leu Cys Leu Glu Glu Ala Gly Val Glu Tyr Glu Leu															
															20 25 30
gtc ccc atg agc cgc gag gcc ggc gac cac cgc cag ccc gac ttc ctc															200
Val Pro Met Ser Arg Glu Ala Gly Asp His Arg Gln Pro Asp Phe Leu															
															35 40 45
gcc cgg aac ccc ttc ggc cag gtc ccc gtt ctc gag gac ggc gac ctc															248
Ala Arg Asn Pro Phe Gly Gln Val Pro Val Leu Glu Asp Gly Asp Leu															
															50 55 60 65

acc atc ttc gag tcg cgc gcc gtc gcg agg cac gtg ctg cgc aag cac	296
Thr Ile Phe Glu Ser Arg Ala Val Ala Arg His Val Leu Arg Lys His	
70 75 80	
aaa ccg gag ctg ctg ggc tcc ggc tcg ccg gag tcg gcg gcg atg gtg	344
Lys Pro Glu Leu Leu Gly Ser Gly Ser Pro Glu Ser Ala Ala Met Val	
85 90 95	
gac gtg tgg ctg gag gtg gag gcc cac cag cac cag acc ccg gcg ggc	392
Asp Val Trp Leu Glu Val Glu Ala His Gln His Gln Thr Pro Ala Gly	
100 105 110	
acc atc gtc atg cag tgc atc ctc acc ccg ttc ctc ggc tgc cag cgc	440
Thr Ile Val Met Gln Cys Ile Leu Thr Pro Phe Leu Gly Cys Gln Arg	
115 120 125	
gac cag gcc gcc atc gac gag aac gcg gca aag ctg acg aat ctg ttc	488
Asp Gln Ala Ala Ile Asp Glu Asn Ala Ala Lys Leu Thr Asn Leu Phe	
130 135 140 145	
gac gtg tac gag gcg cgc ctg tcg gcg tcg agg tac ctt gcc ggg gag	536
Asp Val Tyr Glu Ala Arg Leu Ser Ala Ser Arg Tyr Leu Ala Gly Glu	
150 155 160	
gcg gtc agc ctc gcg gac ctc agc cac ttc ccg ttc atg cga tac ttc	584
Ala Val Ser Leu Ala Asp Leu Ser His Phe Pro Phe Met Arg Tyr Phe	
165 170 175	
atg gac acc gag tac gcg tcg ctg gtg gag gag cgc ccg cac gtg aag	632
Met Asp Thr Glu Tyr Ala Ser Leu Val Glu Glu Arg Pro His Val Lys	
180 185 190	
gcg tgg tgg gag gag ttc aag gcc agc ccg gcg gcg aag agg gtg acg	680
Ala Trp Trp Glu Glu Phe Lys Ala Ser Pro Ala Ala Lys Arg Val Thr	
195 200 205	
gag ttc atg ccg cca aac ttc ggg ttc gga aag aag gca gag aag	725
Glu Phe Met Pro Pro Asn Phe Gly Phe Gly Lys Lys Ala Glu Lys	
210 215 220	
tgatgacaag aacgaacacc gagcgaacat gttgtgtggt ctgtgcgacc cgaccatggc	785
tcaatgtttt gggctgtttg tgtttcacgc atgaatgaat aaaacaaaat gcttttgggt	845
ttcaaaaaaaaa aaaaaaaaaa	865

<210> 4

<211> 224

<212> PRT

<213> Triticum aestivum L.

<400> 4

Met Ala Ala Pro Ala Val Lys Val Tyr Gly Trp Ala Met Ser Pro Phe	
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Val Ala Arg Ala Leu Leu Cys Leu Glu Glu Ala Gly Val Glu Tyr Glu	
20 25 30	
Leu Val Pro Met Ser Arg Glu Ala Gly Asp His Arg Gln Pro Asp Phe	
35 40 45	



85										90					95					
gac	gtg	tgg	ctg	gag	gtg	gag	gcc	cac	cag	tac	aac	ccc	gcg	gcc	agc	395				
Asp	Val	Trp	Leu	Glu	Val	Glu	Ala	His	Gln	Tyr	Asn	Pro	Ala	Ala	Ser					
			100					105					110							
gcc	atc	gtg	gtg	cag	tgc	atc	atc	ttg	ccg	cta	ctg	ggc	ggc	gcg	cgg	443				
Ala	Ile	Val	Val	Gln	Cys	Ile	Ile	Leu	Pro	Leu	Leu	Gly	Gly	Ala	Arg					
		115					120					125								
gac	cag	gcg	gtg	gtg	gac	gag	aac	gta	gcc	aag	ctc	aag	aag	gtg	ctg	491				
Asp	Gln	Ala	Val	Val	Asp	Glu	Asn	Val	Ala	Lys	Leu	Lys	Lys	Val	Leu					
	130					135					140									
gag	gtg	tac	gag	gca	cgg	ctg	tcg	gcg	tcc	agg	tac	ctc	gcc	ggg	gac	539				
Glu	Val	Tyr	Glu	Ala	Arg	Leu	Ser	Ala	Ser	Arg	Tyr	Leu	Ala	Gly	Asp					
145					150				155						160					
gac	atc	agc	ctc	gcc	gac	ctc	agc	cac	ttc	ccc	ttc	acg	cgc	tac	ttc	587				
Asp	Ile	Ser	Leu	Ala	Asp	Leu	Ser	His	Phe	Pro	Phe	Thr	Arg	Tyr	Phe					
				165				170						175						
atg	gag	acg	gag	tac	gcg	ccg	ctg	gtg	gcg	gag	ctc	ccc	cac	gtg	aac	635				
Met	Glu	Thr	Glu	Tyr	Ala	Pro	Leu	Val	Ala	Glu	Leu	Pro	His	Val	Asn					
			180					185					190							
gcg	tgg	tgg	gag	ggg	ctc	aag	gcc	agg	ccg	gcc	gcg	agg	aag	gtg	acg	683				
Ala	Trp	Trp	Glu	Gly	Leu	Lys	Ala	Arg	Pro	Ala	Ala	Arg	Lys	Val	Thr					
		195					200					205								
gag	ctc	atg	ccg	ccg	gac	ctt	ggg	ctt	gga	aag	aaa	gca	gag			725				
Glu	Leu	Met	Pro	Pro	Asp	Leu	Gly	Leu	Gly	Lys	Lys	Ala	Glu							
	210					215					220									
tagtgatgac	tgccgccaac	gttcaccagg	atcgagcaag	tcactgtcga	gtctccggtt	785														
ttgcgttgta	cggcaccggg	gcaccggcct	atatcttctg	taccagtggc	tcgtgttttg	845														
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<211> 222

<212> PRT

<213> Triticum aestivum L.

<400> 6

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		20					25				30				
Val	Ser	Met	Ser	Arg	Ala	Ala	Gly	Asp	His	Arg	Gln	Pro	Asp	Phe	Leu
		35				40					45				
Ala	Arg	Asn	Pro	Phe	Gly	Gln	Val	Pro	Val	Leu	Glu	Asp	Gly	Asp	Leu
	50				55				60						
Thr	Leu	Phe	Glu	Ser	Arg	Ala	Ile	Ala	Arg	His	Val	Leu	Arg	Lys	His
65				70				75				80			
Lys	Pro	Glu	Leu	Leu	Gly	Cys	Gly	Ser	Pro	Glu	Ala	Glu	Ala	Met	Val
			85				90					95			

Asp	Val	Trp	Leu	Glu	Val	Glu	Ala	His	Gln	Tyr	Asn	Pro	Ala	Ala	Ser
			100					105					110		
Ala	Ile	Val	Val	Gln	Cys	Ile	Ile	Leu	Pro	Leu	Leu	Gly	Gly	Ala	Arg
		115					120					125			
Asp	Gln	Ala	Val	Val	Asp	Glu	Asn	Val	Ala	Lys	Leu	Lys	Lys	Val	Leu
	130					135					140				
Glu	Val	Tyr	Glu	Ala	Arg	Leu	Ser	Ala	Ser	Arg	Tyr	Leu	Ala	Gly	Asp
145					150					155				160	
Asp	Ile	Ser	Leu	Ala	Asp	Leu	Ser	His	Phe	Pro	Phe	Thr	Arg	Tyr	Phe
			165					170						175	
Met	Glu	Thr	Glu	Tyr	Ala	Pro	Leu	Val	Ala	Glu	Leu	Pro	His	Val	Asn
	180							185					190		
Ala	Trp	Trp	Glu	Gly	Leu	Lys	Ala	Arg	Pro	Ala	Ala	Arg	Lys	Val	Thr
	195					200						205			
Glu	Leu	Met	Pro	Pro	Asp	Leu	Gly	Leu	Gly	Lys	Lys	Ala	Glu		
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	Met	Ala	Pro	Val	Lys	Leu	Tyr	Gly	Ala	Thr	Leu	Ser	Trp		
	1				5					10					
aac	gtc	acc	agg	tgc	gtg	gcg	gcg	ctg	gag	gag	gcc	ggc	gtc	cag	tac
Asn	Val	Thr	Arg	Cys	Val	Ala	Ala	Leu	Glu	Glu	Ala	Gly	Val	Gln	Tyr
	15					20					25				158
gag	atc	gta	ccc	atc	aac	ttc	ggc	acc	ggc	gag	cac	aag	agc	ccc	gac
Glu	Ile	Val	Pro	Ile	Asn	Phe	Gly	Thr	Gly	Glu	His	Lys	Ser	Pro	Asp
	30				35				40					45	206
cac	ctc	gcc	agg	aac	ccc	ttc	ggc	cag	gtg	cca	gct	ttg	cag	gat	ggt
His	Leu	Ala	Arg	Asn	Pro	Phe	Gly	Gln	Val	Pro	Ala	Leu	Gln	Asp	Gly
			50					55					60		254
gac	tta	tac	gtc	ttc	gaa	tca	cgt	gct	att	tgc	aag	tac	gcg	tgc	cgc
Asp	Leu	Tyr	Val	Phe	Glu	Ser	Arg	Ala	Ile	Cys	Lys	Tyr	Ala	Cys	Arg
			65				70						75		302
aag	aac	aag	cca	gag	ctg	ttg	aag	gag	ggc	gac	atc	aag	gag	tca	gca
Lys	Asn	Lys	Pro	Glu	Leu	Leu	Lys	Glu	Gly	Asp	Ile	Lys	Glu	Ser	Ala
	80						85					90			350
atg	gtg	gat	gtg	tgg	ctc	gag	gtg	gag	gcc	cat	cag	tac	act	gcc	gct
Met	Val	Asp	Val	Trp	Leu	Glu	Val	Glu	Ala	His	Gln	Tyr	Thr	Ala	Ala
	95					100					105				398

ctg agc ccc att ctc ttc gag tgc ctt atc cat cca atg ctt ggg gga	446
Leu Ser Pro Ile Leu Phe Glu Cys Leu Ile His Pro Met Leu Gly Gly	
110 115 120 125	
gcc act gac cag aag gtc atc gac gac aac ctt gtt aag atc aag aac	494
Ala Thr Asp Gln Lys Val Ile Asp Asp Asn Leu Val Lys Ile Lys Asn	
130 135 140	
gtg ctg gcg gtg tac gag gcg cac ctg agc aag tcc aag tac ctg gct	542
Val Leu Ala Val Tyr Glu Ala His Leu Ser Lys Ser Lys Tyr Leu Ala	
145 150 155	
gga gac ttc ctc agt ctt gcg gac ctt aac cat gtg tct gtc acc ctg	590
Gly Asp Phe Leu Ser Leu Ala Asp Leu Asn His Val Ser Val Thr Leu	
160 165 170	
tgc ttg gcg gct aca ccc tat gcg tct ctg ttc gac gcg tac ccg cat	638
Cys Leu Ala Ala Thr Pro Tyr Ala Ser Leu Phe Asp Ala Tyr Pro His	
175 180 185	
gtg aag gcc tgg tgg act gac ctg ctg gcg agg ccg tcc gtc cag aag	686
Val Lys Ala Trp Trp Thr Asp Leu Leu Ala Arg Pro Ser Val Gln Lys	
190 195 200 205	
gtc gca gcg ctg atg aag cca tgatcttaat tgctggtgct cgttcgtcgc	737
Val Ala Ala Leu Met Lys Pro	
210	
gaaataagcc gaggtgtgtg cccccgatg tgtgcctgta cgagtgtgtg ttcttgtgat	797
gtctcctcgt gttgaatgtt caggcttgtg cttgcgatcc tgtctcatct tttactgaaa	857
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aaaaaaaaaa	927

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 <213> Triticum aestivum L.

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Arg	Cys	Val	Ala	Ala	Leu	Glu	Glu	Ala	Gly	Val	Gln	Tyr	Glu	Ile	Val
		20						25					30		
Pro	Ile	Asn	Phe	Gly	Thr	Gly	Glu	His	Lys	Ser	Pro	Asp	His	Leu	Ala
		35				40						45			
Arg	Asn	Pro	Phe	Gly	Gln	Val	Pro	Ala	Leu	Gln	Asp	Gly	Asp	Leu	Tyr
	50				55					60					
Val	Phe	Glu	Ser	Arg	Ala	Ile	Cys	Lys	Tyr	Ala	Cys	Arg	Lys	Asn	Lys
65				70					75					80	
Pro	Glu	Leu	Leu	Lys	Glu	Gly	Asp	Ile	Lys	Glu	Ser	Ala	Met	Val	Asp
				85				90						95	
Val	Trp	Leu	Glu	Val	Glu	Ala	His	Gln	Tyr	Thr	Ala	Ala	Leu	Ser	Pro
			100					105					110		
Ile	Leu	Phe	Glu	Cys	Leu	Ile	His	Pro	Met	Leu	Gly	Gly	Ala	Thr	Asp
		115					120					125			
Gln	Lys	Val	Ile	Asp	Asp	Asn	Leu	Val	Lys	Ile	Lys	Asn	Val	Leu	Ala
		130				135						140			



Val	Tyr	Glu	Ala	His	Leu	Ser	Lys	Ser	Lys	Tyr	Leu	Ala	Gly	Asp	Phe
145					150					155					160
Leu	Ser	Leu	Ala	Asp	Leu	Asn	His	Val	Ser	Val	Thr	Leu	Cys	Leu	Ala
				165					170						175
Ala	Thr	Pro	Tyr	Ala	Ser	Leu	Phe	Asp	Ala	Tyr	Pro	His	Val	Lys	Ala
			180					185					190		
Trp	Trp	Thr	Asp	Leu	Leu	Ala	Arg	Pro	Ser	Val	Gln	Lys	Val	Ala	Ala
	195						200					205			
Leu	Met	Lys	Pro												
	210														

<210> 9  
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 <213> Triticum aestivum L.

<220>  
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 <222> (45)...(683)  
 <223> WIC 5

gaagcaggca acaggcgagc aggaaggaag caagagaggt ggag atg gcg ccc atc															56
Met Ala Pro Ile															
1															
aag ctg tac ggg atg atg ctg tcg gcc aac gtg acc cgc gtg acc acg															104
Lys	Leu	Tyr	Gly	Met	Met	Leu	Ser	Ala	Asn	Val	Thr	Arg	Val	Thr	Thr
5					10					15				20	
ctg ctc aac gag ctc ggc ctc gag ttc gac ttc gtc gac gtc gac ctc															152
Leu	Leu	Asn	Glu	Leu	Gly	Leu	Glu	Phe	Asp	Phe	Val	Asp	Val	Asp	Leu
			25					30						35	
cgc acc ggc gcc cac aag cac ccc gac ttc ctc aag ctc aac cct ttc															200
Arg	Thr	Gly	Ala	His	Lys	His	Pro	Asp	Phe	Leu	Lys	Leu	Asn	Pro	Phe
			40					45					50		
ggc cag atc ccc gcg ctg cag gac gga gac gaa gtt gtc ttc gag tcg															248
Gly	Gln	Ile	Pro	Ala	Leu	Gln	Asp	Gly	Asp	Glu	Val	Val	Phe	Glu	Ser
	55					60				65					
cgc gcc atc aac cgg tac atc gcg acc aag tac ggg gcg tcc ctg ctg															296
Arg	Ala	Ile	Asn	Arg	Tyr	Ile	Ala	Thr	Lys	Tyr	Gly	Ala	Ser	Leu	Leu
	70					75					80				
ccg acg ccg tcg gcc aag ctg gag gcg tgg ctg gag gtg gag tcg cac															344
Pro	Thr	Pro	Ser	Ala	Lys	Leu	Glu	Ala	Trp	Leu	Glu	Val	Glu	Ser	His
	85				90					95				100	
cac ttc tac ccg ccg gcg cgg acg ctg gtg tac gag ctg gtc atc aag															392
His	Phe	Tyr	Pro	Pro	Ala	Arg	Thr	Leu	Val	Tyr	Glu	Leu	Val	Ile	Lys
			105					110						115	
ccc atg ctg ggc gcc ccc acc gac gcc gcc gag gtg gac aag aac gcc															440
Pro	Met	Leu	Gly	Ala	Pro	Thr	Asp	Ala	Ala	Glu	Val	Asp	Lys	Asn	Ala
			120					125					130		

gcc gac ctc gcc aag ctg ctc gac gtc tac gag gcc cac ctc gcc gcc	488
Ala Asp Leu Ala Lys Leu Leu Asp Val Tyr Glu Ala His Leu Ala Ala	
135 140 145	
ggg aac aag tac ctg gcc ggc gac gcc ttc ccg ctc gcc gac gcc aac	536
Gly Asn Lys Tyr Leu Ala Gly Asp Ala Phe Pro Leu Ala Asp Ala Asn	
150 155 160	
cac atg tcc tac ctc ttc atg ctc acc aag agc ccc aag gcg gac ctg	584
His Met Ser Tyr Leu Phe Met Leu Thr Lys Ser Pro Lys Ala Asp Leu	
165 170 175 180	
gtg gcc tcc cgc ccg cac gtc aag gcc tgg tgg gag gag atc tcc gcc	632
Val Ala Ser Arg Pro His Val Lys Ala Trp Trp Glu Glu Ile Ser Ala	
185 190 195	
cgc ccc gcc tgg gcc aag acc gtc gcc tcc atc ccc ctc ccg ccc gcc	680
Arg Pro Ala Trp Ala Lys Thr Val Ala Ser Ile Pro Leu Pro Pro Ala	
200 205 210	
gtc tgagggttgct tgtttggtcg cggcgagaac ggaataaaat cgcgatgatg	733
Val	
gaataaaciaa ctttttagag aggaagcttg gaattcttgg tgttgctgct gttgaatgtt	793
gaatcttggt gttgaatgtt tacggcacat ctaatttatt cagttttttt ggcgtgaaaa	853
aaaaaaaaaa aaa	866

<210> 10  
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 <212> PRT  
 <213> Triticum aestivum L.

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Arg Val Thr Thr Leu Leu Asn Glu Leu Gly Leu Glu Phe Asp Phe Val	
20 25 30	
Asp Val Asp Leu Arg Thr Gly Ala His Lys His Pro Asp Phe Leu Lys	
35 40 45	
Leu Asn Pro Phe Gly Gln Ile Pro Ala Leu Gln Asp Gly Asp Glu Val	
50 55 60	
Val Phe Glu Ser Arg Ala Ile Asn Arg Tyr Ile Ala Thr Lys Tyr Gly	
65 70 75 80	
Ala Ser Leu Leu Pro Thr Pro Ser Ala Lys Leu Glu Ala Trp Leu Glu	
85 90 95	
Val Glu Ser His His Phe Tyr Pro Pro Ala Arg Thr Leu Val Tyr Glu	
100 105 110	
Leu Val Ile Lys Pro Met Leu Gly Ala Pro Thr Asp Ala Ala Glu Val	
115 120 125	
Asp Lys Asn Ala Ala Asp Leu Ala Lys Leu Leu Asp Val Tyr Glu Ala	
130 135 140	
His Leu Ala Ala Gly Asn Lys Tyr Leu Ala Gly Asp Ala Phe Pro Leu	
145 150 155 160	
Ala Asp Ala Asn His Met Ser Tyr Leu Phe Met Leu Thr Lys Ser Pro	
165 170 175	

Lys Ala Asp Leu Val Ala Ser Arg Pro His Val Lys Ala Trp Trp Glu  
                   180                  185                  190  
 Glu Ile Ser Ala Arg Pro Ala Trp Ala Lys Thr Val Ala Ser Ile Pro  
                   195                  200                  205  
 Leu Pro Pro Ala Val  
           210

<210> 11  
 <211> 897  
 <212> DNA  
 <213> Triticum aestivum L.

<220>  
 <221> CDS  
 <222> (15)...(668)  
 <223> WIC 4 and WIC 10

<221> gene  
 <222> (1)...(897)  
 <223> WIC 4 cDNA

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                   1                  5                  10  
  
 acc aac gtg gcc cgg gtg ctg gtg tgc ctg gag gag gtc ggc gcc gag 98  
 Thr Asn Val Ala Arg Val Leu Val Cys Leu Glu Glu Val Gly Ala Glu  
           15                  20                  25  
  
 tac gag gtg gtc gac atc gat ttc aag gcc atg gag cac aag agc ccc 146  
 Tyr Glu Val Val Asp Ile Asp Phe Lys Ala Met Glu His Lys Ser Pro  
           30                  35                  40  
  
 gag cat ctc gtc aga aac ccg ttc ggc caa atc cct gcc ttc cag gat 194  
 Glu His Leu Val Arg Asn Pro Phe Gly Gln Ile Pro Ala Phe Gln Asp  
           45                  50                  55                  60  
  
 ggg gat ctg ctt ctc ttc gag tca cgc gca att gcg agg tac gtg ctc 242  
 Gly Asp Leu Leu Leu Phe Glu Ser Arg Ala Ile Ala Arg Tyr Val Leu  
                   65                  70                  75  
  
 cgc aag tac aag aag aac gaa gtg gac ctg ctg agg gaa ggc gac ctc 290  
 Arg Lys Tyr Lys Lys Asn Glu Val Asp Leu Leu Arg Glu Gly Asp Leu  
                   80                  85                  90  
  
 aag gag gcg gcg atg gtg gac gta tgg acg gag gtg gac gcg cac acc 338  
 Lys Glu Ala Ala Met Val Asp Val Trp Thr Glu Val Asp Ala His Thr  
           95                  100                  105  
  
 tac aac ccg gcc atc tcg ccg atc gtg tac gag tgc tca tca acc gct 386  
 Tyr Asn Pro Ala Ile Ser Pro Ile Val Tyr Glu Cys Ser Ser Thr Ala  
           110                  115                  120  
  
 cat gcg ccg ctg ccg acc aac caa acg gtg gtg gac gag agc ctg gag 434  
 His Ala Arg Leu Pro Thr Asn Gln Thr Val Val Asp Glu Ser Leu Glu  
           125                  130                  135                  140

aag ctc aag aac gtg ctg gag gtc tac gag gcg cgc ctg tcc aag cac	482
Lys Leu Lys Asn Val Leu Glu Val Tyr Glu Ala Arg Leu Ser Lys His	
145 150 155	
gac tac ctc gcc ggg gac ttc gtc agc ttc gcg gac ctc aac cac ttc	530
Asp Tyr Leu Ala Gly Asp Phe Val Ser Phe Ala Asp Leu Asn His Phe	
160 165 170	
ccc tac acc ttc tac ttc atg gcc acg ccg cac gcg gcc ctc ttc gac	578
Pro Tyr Thr Phe Tyr Phe Met Ala Thr Pro His Ala Ala Leu Phe Asp	
175 180 185	
tcg tac ccg cac gtc aag gcc tgg tgg gag agg atc atg gcg agg ccg	626
Ser Tyr Pro His Val Lys Ala Trp Trp Glu Arg Ile Met Ala Arg Pro	
190 195 200	
gcc gtg aag aag ctc gcc gcg cag atg gtt ccc aag aag ccg	668
Ala Val Lys Lys Leu Ala Ala Gln Met Val Pro Lys Lys Pro	
205 210 215	
tgatttgcta ggccgggatct cgcacgtgg gatccgattc cgatcactga tctgtgtggc	728
gttttctttt cttgttggtg tcgcgaataa ggcaaatgag ctcgtgtgtg tgtggctgga	788
attgcaccag cgtgcagttt ttgcgctttg cgtgtgtgtg gtcgtgaaaa ctcttgagat	848
ggaacaatgt cttcgtaatg ctttcacatt ttaaaaaaaaa aaaaaaaaaa	897

<210> 12  
 <211> 218  
 <212> PRT  
 <213> Triticum aestivum L.

<400> 12

Met Ala Pro Val Lys Val Phe Gly Pro Ala Met Ser Thr Asn Val Ala	
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Arg Val Leu Val Cys Leu Glu Glu Val Gly Ala Glu Tyr Glu Val Val	
20 25 30	
Asp Ile Asp Phe Lys Ala Met Glu His Lys Ser Pro Glu His Leu Val	
35 40 45	
Arg Asn Pro Phe Gly Gln Ile Pro Ala Phe Gln Asp Gly Asp Leu Leu	
50 55 60	
Leu Phe Glu Ser Arg Ala Ile Ala Arg Tyr Val Leu Arg Lys Tyr Lys	
65 70 75 80	
Lys Asn Glu Val Asp Leu Leu Arg Glu Gly Asp Leu Lys Glu Ala Ala	
85 90 95	
Met Val Asp Val Trp Thr Glu Val Asp Ala His Thr Tyr Asn Pro Ala	
100 105 110	
Ile Ser Pro Ile Val Tyr Glu Cys Ser Ser Thr Ala His Ala Arg Leu	
115 120 125	
Pro Thr Asn Gln Thr Val Val Asp Glu Ser Leu Glu Lys Leu Lys Asn	
130 135 140	
Val Leu Glu Val Tyr Glu Ala Arg Leu Ser Lys His Asp Tyr Leu Ala	
145 150 155 160	
Gly Asp Phe Val Ser Phe Ala Asp Leu Asn His Phe Pro Tyr Thr Phe	
165 170 175	
Tyr Phe Met Ala Thr Pro His Ala Ala Leu Phe Asp Ser Tyr Pro His	
180 185 190	
Val Lys Ala Trp Trp Glu Arg Ile Met Ala Arg Pro Ala Val Lys Lys	

	195		200		205					
Leu	Ala	Ala	Gln	Met	Val	Pro	Lys	Lys	Pro	
	210					215				

<210> 13  
 <211> 721  
 <212> DNA  
 <213> Triticum aestivum L.  
  
 <220>  
 <221> CDS  
 <222> (21)...(686)  
 <223> Glutathione S transferase  
  
 <221> gene  
 <222> (1)...(721)  
 <223> TA 27 cDNA  
  
 <400> 13

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Met Glu Pro Met Lys Val Tyr Gly Trp Ala Val	
1 5 10	
tcg cca tgg atg gcg cgg gtc ctc gtc tcc ctg gag gag gcc ggc gcc	101
Ser Pro Trp Met Ala Arg Val Leu Val Ser Leu Glu Glu Ala Gly Ala	
15 20 25	
gac tac gag ctc gtg ccc atg agc cgc aac ggc ggc gac cac cgg cgg	149
Asp Tyr Glu Leu Val Pro Met Ser Arg Asn Gly Gly Asp His Arg Arg	
30 35 40	
ccg gag cac ctc gcc aga aac ccc ttc ggt gag atc ccg gtg ctc gaa	197
Pro Glu His Leu Ala Arg Asn Pro Phe Gly Glu Ile Pro Val Leu Glu	
45 50 55	
tac ggc ggt ctg acg ctt tac caa tcc cgc gcc att gca agg cat att	245
Tyr Gly Gly Leu Thr Leu Tyr Gln Ser Arg Ala Ile Ala Arg His Ile	
60 65 70 75	
ctc cgc aaa cac aag ccc ggg ctt cta gga gca ggc agc ctc gag gag	293
Leu Arg Lys His Lys Pro Gly Leu Leu Gly Ala Gly Ser Leu Glu Glu	
80 85 90	
tcg gcg atg gtg gat gta tgg gtc gac gtg gat gcc cac cac ctg gag	341
Ser Ala Met Val Asp Val Trp Val Asp Val Asp Ala His His Leu Glu	
95 100 105	
ccc gta ctc aag ccc atc gtg tgg aac tgc atc atc aac ccg ttc gtc	389
Pro Val Leu Lys Pro Ile Val Trp Asn Cys Ile Ile Asn Pro Phe Val	
110 115 120	
ggg agg gac gtc gac cag ggc ctc gtc gat gag agc gtc gag aag ctc	437
Gly Arg Asp Val Asp Gln Gly Leu Val Asp Glu Ser Val Glu Lys Leu	
125 130 135	
aag aag ctg ctg gag gtg tac gag gca aga ctg tca agc aac aag tac	485
Lys Lys Leu Leu Glu Val Tyr Glu Ala Arg Leu Ser Ser Asn Lys Tyr	

140				145				150				155					
ttg gcc ggg gat ttc gtc agc ttc gcc gac ctc acc cat ttc tcc ttc																	533
Leu Ala Gly Asp Phe Val Ser Phe Ala Asp Leu Thr His Phe Ser Phe																	
	160								165				170				
atg cgc tac ttc atg gcg acg gag cat gcg gtt gtg ctc gat gcg tat																	581
Met Arg Tyr Phe Met Ala Thr Glu His Ala Val Val Leu Asp Ala Tyr																	
	175								180				185				
ccg cat gtg aag gca tgg tgg aag gcg ctg ctg gca agg cca tcg gtc																	629
Pro His Val Lys Ala Trp Trp Lys Ala Leu Leu Ala Arg Pro Ser Val																	
	190								195				200				
aag aag gtg ata gct ggc atg cct ccg gat ttt gga ttc ggg agc ggg																	677
Lys Lys Val Ile Ala Gly Met Pro Pro Asp Phe Gly Phe Gly Ser Gly																	
	205								210				215				
aga ata cca tgataaaagca tgcttggttgc tctatgatgc tctga																	721
Arg Ile Pro																	
220																	

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Arg	Val	Leu	Val	Ser	Leu	Glu	Glu	Ala 25	Gly	Ala	Asp	Tyr	Glu	Leu	Val	
			20										30			
Pro	Met	Ser	Arg	Asn	Gly	Gly	Asp	His	Arg	Arg	Pro	Glu	His	Leu	Ala	
		35					40					45				
Arg	Asn	Pro	Phe	Gly	Glu	Ile	Pro	Val	Leu	Glu	Tyr	Gly	Gly	Leu	Thr	
	50					55					60					
Leu 65	Tyr	Gln	Ser	Arg	Ala	Ile	Ala	Arg	His	Ile	Leu	Arg	Lys	His	Lys	
				70						75				80		
Pro	Gly	Leu	Leu	Gly	Ala	Gly	Ser	Leu	Glu	Glu	Ser	Ala	Met	Val	Asp	
				85					90					95		
Val	Trp	Val	Asp	Val	Asp	Ala	His	His	Leu	Glu	Pro	Val	Leu	Lys	Pro	
			100					105					110			
Ile	Val	Trp	Asn	Cys	Ile	Ile	Asn	Pro	Phe	Val	Gly	Arg	Asp	Val	Asp	
		115					120					125				
Gln	Gly	Leu	Val	Asp	Glu	Ser	Val	Glu	Lys	Leu	Lys	Lys	Leu	Leu	Glu	
	130					135					140					
Val 145	Tyr	Glu	Ala	Arg	Leu	Ser	Ser	Asn	Lys	Tyr	Leu	Ala	Gly	Asp	Phe	
				150						155				160		
Val	Ser	Phe	Ala	Asp	Leu	Thr	His	Phe	Ser	Phe	Met	Arg	Tyr	Phe	Met	
				165					170					175		
Ala	Thr	Glu	His	Ala	Val	Val	Leu	Asp	Ala	Tyr	Pro	His	Val	Lys	Ala	
			180					185					190			
Trp	Trp	Lys	Ala	Leu	Leu	Ala	Arg	Pro	Ser	Val	Lys	Lys	Val	Ile	Ala	
		195					200					205				
Gly	Met	Pro	Pro	Asp	Phe	Gly	Phe	Gly	Ser	Gly	Arg	Ile	Pro			
	210					215					220					

<210> 15  
 <211> 926  
 <212> DNA  
 <213> Triticum aestivum L.

<220>  
 <221> CDS  
 <222> (66)...(764)  
 <223> Glutathione S transferase

<221> gene  
 <222> (1)...(926)  
 <223> cDNA clone ICR

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 aaccactttc atcaacgtct cctacgctca ccgttcgttg ctccgcacat cagcaggact 60  
 tgcca atg gcg gga gac ggc gag ctg aag ctg ctg ggc gtg tgg acg agc 110  
 Met Ala Gly Asp Gly Glu Leu Lys Leu Leu Gly Val Trp Thr Ser  
 1 5 10 15

ccg ttc gtc atc agg gtg cgc gtg gtg ctc aac ctc aag tcg ctg ccg 158  
 Pro Phe Val Ile Arg Val Arg Val Val Leu Asn Leu Lys Ser Leu Pro  
 20 25 30

tac gag tac gtg gag gag agc ctg ggc agc aag agc gcg ctc ctc ctg 206  
 Tyr Glu Tyr Val Glu Glu Ser Leu Gly Ser Lys Ser Ala Leu Leu Leu  
 35 40 45

ggc tcc aac ccg gtg cac cag agc gtg ccc gtc ctc ctc cac ggc ggc 254  
 Gly Ser Asn Pro Val His Gln Ser Val Pro Val Leu Leu His Gly Gly  
 50 55 60

cgc ccc gtg aac gag tcc cag gtc atc gtg cag tac atc gac gag gtc 302  
 Arg Pro Val Asn Glu Ser Gln Val Ile Val Gln Tyr Ile Asp Glu Val  
 65 70 75

tgg gcg ggg gcc ggc ccg tcc gtg ctc ccg gcc gac ccc tac gag cgc 350  
 Trp Ala Gly Ala Gly Pro Ser Val Leu Pro Ala Asp Pro Tyr Glu Arg  
 80 85 90 95

gcc acg gcg cgc ttc tgg gcg gcg tac gtc gac gac aag gtc ggg tcg 398  
 Ala Thr Ala Arg Phe Trp Ala Ala Tyr Val Asp Asp Lys Val Gly Ser  
 100 105 110

gcg tgg acg ggg atg ctc ttc tcg tgc aag acg gag gag gag cgg gcg 446  
 Ala Trp Thr Gly Met Leu Phe Ser Cys Lys Thr Glu Glu Glu Arg Ala  
 115 120 125

gag gcg gtg tcc cgg gcc gtg gcg gcg ctg gag acc ctg gag ggc gcg 494  
 Glu Ala Val Ser Arg Ala Val Ala Ala Leu Glu Thr Leu Glu Gly Ala  
 130 135 140

ttc gcg gag tgc tcc aag ggg aag gcg ttc ttc ggc ggc gac gcc atc 542  
 Phe Ala Glu Cys Ser Lys Gly Lys Ala Phe Phe Gly Gly Asp Ala Ile  
 145 150 155

ggg ttc gtc gac gtc gtg ctt ggc ggc tac ctc ggc tgg ttc ggc gcg	590
Gly Phe Val Asp Val Val Leu Gly Gly Tyr Leu Gly Trp Phe Gly Ala	
160 165 170 175	
atc gac aag atc atc ggg cgc cgg ctg atc gac ccg gcg agg acg ccg	638
Ile Asp Lys Ile Ile Gly Arg Arg Leu Ile Asp Pro Ala Arg Thr Pro	
180 185 190	
ctg ctg gcc agg tgg gag gag cgg ttc cgc gcg gcg gac gcg gcc aag	686
Leu Leu Ala Arg Trp Glu Glu Arg Phe Arg Ala Ala Asp Ala Ala Lys	
195 200 205	
ggc gtc gtg ccg gac gac gcc gac aag atg ctc gag ttc ttg ccc acc	734
Gly Val Val Pro Asp Asp Ala Asp Lys Met Leu Glu Phe Leu Pro Thr	
210 215 220	
gtg ctc gct tgg atc gcc ggc aaa gcg aag tgaactgtgt ctgtgaggcc	784
Val Leu Ala Trp Ile Ala Gly Lys Ala Lys	
225 230	
gtgacatcgc cagctcgtga catgtgtgtt tgtgtgtgtc tgagtccgtc cagtgtgtgc	844
tgaataaatg caccgcatgt cgtgtgttgt accaaggga aacaatgctg aataattttg	904
ctgttaaaaa aaaaaaaaaa aa	926

<210> 16  
 <211> 233  
 <212> PRT  
 <213> Triticum aestivum L.

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Phe Val Ile Arg Val Arg Val Val Leu Asn Leu Lys Ser Leu Pro Tyr	
20 25 30	
Glu Tyr Val Glu Glu Ser Leu Gly Ser Lys Ser Ala Leu Leu Gly	
35 40 45	
Ser Asn Pro Val His Gln Ser Val Pro Val Leu Leu His Gly Gly Arg	
50 55 60	
Pro Val Asn Glu Ser Gln Val Ile Val Gln Tyr Ile Asp Glu Val Trp	
65 70 75 80	
Ala Gly Ala Gly Pro Ser Val Leu Pro Ala Asp Pro Tyr Glu Arg Ala	
85 90 95	
Thr Ala Arg Phe Trp Ala Ala Tyr Val Asp Asp Lys Val Gly Ser Ala	
100 105 110	
Trp Thr Gly Met Leu Phe Ser Cys Lys Thr Glu Glu Glu Arg Ala Glu	
115 120 125	
Ala Val Ser Arg Ala Val Ala Ala Leu Glu Thr Leu Glu Gly Ala Phe	
130 135 140	
Ala Glu Cys Ser Lys Gly Lys Ala Phe Phe Gly Gly Asp Ala Ile Gly	
145 150 155 160	
Phe Val Asp Val Val Leu Gly Gly Tyr Leu Gly Trp Phe Gly Ala Ile	
165 170 175	
Asp Lys Ile Ile Gly Arg Arg Leu Ile Asp Pro Ala Arg Thr Pro Leu	
180 185 190	
Leu Ala Arg Trp Glu Glu Arg Phe Arg Ala Ala Asp Ala Ala Lys Gly	
195 200 205	
Val Val Pro Asp Asp Ala Asp Lys Met Leu Glu Phe Leu Pro Thr Val	



210  
Leu Ala Trp Ile Ala Gly Lys Ala Lys  
225 230

220

<210> 17  
<211> 1043  
<212> DNA  
<213> Triticum aestivum L.

<220>  
<221> CDS  
<222> (39)...(767)  
<223> Glutathione S transferase

<221> gene  
<222> (1)...(1043)  
<223> cDNA clones ICC, ICP, and ICV

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Met Ala Gly Gly Glu Glu  
1 5

ctg aag ctg ctg ggg tgg tgg gcg ccc ggg gtg agt ccc tac gtg ctg 104  
Leu Lys Leu Leu Gly Trp Trp Ala Pro Gly Val Ser Pro Tyr Val Leu  
10 15 20

cgc gcc cag atg gcg ctc gcc gta aag ggg ctg agc tac gac tac ctc 152  
Arg Ala Gln Met Ala Leu Ala Val Lys Gly Leu Ser Tyr Asp Tyr Leu  
25 30 35

ccc gag gac cgc tgg tcc acg agc gac ctc ctc atc gcg tcc aac ccc 200  
Pro Glu Asp Arg Trp Ser Thr Ser Asp Leu Leu Ile Ala Ser Asn Pro  
40 45 50

gtg tac aag aag gtg ccc gtc ctc att cac aac ggc agg ccc gtc tgc 248  
Val Tyr Lys Lys Val Pro Val Leu Ile His Asn Gly Arg Pro Val Cys  
55 60 65 70

gag tcg ctg ctc atc ctg gag tac ctc gac gac gcc gtc ggc ctt gcc 296  
Glu Ser Leu Leu Ile Leu Glu Tyr Leu Asp Asp Ala Val Gly Leu Ala  
75 80 85

ggc aac ggc aag ccc atc ctc ccc gca gac ccc tac agc cgc gcc gtc 344  
Gly Asn Gly Lys Pro Ile Leu Pro Ala Asp Pro Tyr Ser Arg Ala Val  
90 95 100

gct cgc ttc tgg gcc gcc tat gtg aac gac aag ctg ttc cct tcg tgc 392  
Ala Arg Phe Trp Ala Ala Tyr Val Asn Asp Lys Leu Phe Pro Ser Cys  
105 110 115

acc ggg atc ctc aag act acg aag cag gag gag aga gcc ggt aag atg 440  
Thr Gly Ile Leu Lys Thr Thr Lys Gln Glu Glu Arg Ala Gly Lys Met  
120 125 130

gag gag acc ctg tcc ggg ctc aga cac tta gaa gct gtc atg gcg gag 488  
Glu Glu Thr Leu Ser Gly Leu Arg His Leu Glu Ala Val Met Ala Glu

135	140	145	150	
tgc tcc gaa ggg gag gcg gag gcg ccg ttc ttc ggt ggt gac gcc atc				536
Cys Ser Glu Gly Glu Ala Glu Ala Pro Phe Phe Gly Gly Asp Ala Ile				
	155	160	165	
ggg ttc ctc gac atc gcg ctc ggg tgc tat ctt ccc tgg ttt gag gca				584
Gly Phe Leu Asp Ile Ala Leu Gly Cys Tyr Leu Pro Trp Phe Glu Ala				
	170	175	180	
gca ggc cgc ctg gcc ggc ttg ggg ccg atc atc gac ccg gcg agg acg				632
Ala Gly Arg Leu Ala Gly Leu Gly Pro Ile Ile Asp Pro Ala Arg Thr				
	185	190	195	
ccg aaa cta gct gcg tgg gcg gag ccg ttc agc gtc gcc gag ccg atc				680
Pro Lys Leu Ala Ala Trp Ala Glu Arg Phe Ser Val Ala Glu Pro Ile				
	200	205	210	
aag gcg ctg ctg cct ggg gtc gac aag ctg gag gag tac atc act acg				728
Lys Ala Leu Leu Pro Gly Val Asp Lys Leu Glu Glu Tyr Ile Thr Thr				
	215	220	225	230
gcg ctt tat cca aag tgg aac atc gcg gtc acc ggc aac taattaaaga				777
Ala Leu Tyr Pro Lys Trp Asn Ile Ala Val Thr Gly Asn				
	235	240		
tcttgtcggtt ccactatggc aaaagaaata aaaaagggcg tcgttcgata accggcggag				837
gatctctgcc ttgtgagtag ctgttttcac gtcaagagtt gaactgttac tactaagtcg				897
ggtttctttt tgcgaggggtt agtgggtcgt ggtcatgaat aatgcacagg cgtgcactct				957
cttcgatctg agttgtgata tgttgtttcg tgaataaatt gaagcgctcgt cgatcttgca				1017
tctaaaaaaaa aaaaaaaaaa aaaaaa				1043

<210> 18  
 <211> 243  
 <212> PRT  
 <213> Triticum aestivum L.

<400> 18

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Val	Ser	Pro	Tyr	Val	Leu	Arg	Ala	Gln	Met	Ala	Leu	Ala	Val	Lys	Gly
			20					25					30		
Leu	Ser	Tyr	Asp	Tyr	Leu	Pro	Glu	Asp	Arg	Trp	Ser	Thr	Ser	Asp	Leu
			35				40					45			
Leu	Ile	Ala	Ser	Asn	Pro	Val	Tyr	Lys	Lys	Val	Pro	Val	Leu	Ile	His
	50				55					60					
Asn	Gly	Arg	Pro	Val	Cys	Glu	Ser	Leu	Leu	Ile	Leu	Glu	Tyr	Leu	Asp
65				70					75					80	
Asp	Ala	Val	Gly	Leu	Ala	Gly	Asn	Gly	Lys	Pro	Ile	Leu	Pro	Ala	Asp
			85					90					95		
Pro	Tyr	Ser	Arg	Ala	Val	Ala	Arg	Phe	Trp	Ala	Ala	Tyr	Val	Asn	Asp
			100				105					110			
Lys	Leu	Phe	Pro	Ser	Cys	Thr	Gly	Ile	Leu	Lys	Thr	Thr	Lys	Gln	Glu
		115				120					125				
Glu	Arg	Ala	Gly	Lys	Met	Glu	Glu	Thr	Leu	Ser	Gly	Leu	Arg	His	Leu
	130					135					140				
Glu	Ala	Val	Met	Ala	Glu	Cys	Ser	Glu	Gly	Glu	Ala	Glu	Ala	Pro	Phe

145		150		155		160									
Phe	Gly	Gly	Asp	Ala	Ile	Gly	Phe	Leu	Asp	Ile	Ala	Leu	Gly	Cys	Tyr
				165					170					175	
Leu	Pro	Trp	Phe	Glu	Ala	Ala	Gly	Arg	Leu	Ala	Gly	Leu	Gly	Pro	Ile
				180				185					190		
Ile	Asp	Pro	Ala	Arg	Thr	Pro	Lys	Leu	Ala	Ala	Trp	Ala	Glu	Arg	Phe
		195					200					205			
Ser	Val	Ala	Glu	Pro	Ile	Lys	Ala	Leu	Leu	Pro	Gly	Val	Asp	Lys	Leu
	210					215				220					
Glu	Glu	Tyr	Ile	Thr	Thr	Ala	Leu	Tyr	Pro	Lys	Trp	Asn	Ile	Ala	Val
225					230				235					240	
Thr	Gly	Asn													

<210> 19

<211> 24

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligonucleotide primer to introduce NdeI site into translation start site of ICJ

<400> 19

aggtagttac atatggccgg agga